



Contribution ID: 625

Type: **Parallel session talk**

Search for Heavy Neutral Leptons in τ -lepton decays with the *BABAR* detector.

Friday 25 August 2023 08:30 (15 minutes)

This talk presents a model independent search for an additional heavy, mostly sterile, neutral lepton (HNL) which is capable of mixing with the Standard Model tau neutrino with a mixing strength of $|U_{\tau 4}|^2$, corresponding to the square of the extended Pontecorvo–Maki–Nakagawa–Sakata (PMNS) matrix element. HNLs are hypothetical particles predicted by many beyond-Standard-Model theories. HNLs can explain oscillation anomalies as well as the baryon asymmetry in the universe through leptogenesis, and can also provide dark matter candidates. We search for HNL production in the decays of the tau lepton analyzing a data set from the *BABAR* experiment, with a total integrated luminosity of 424 fb^{-1} . A kinematic approach is taken and no assumptions are made regarding the model behind the origins of the HNL, its lifetime or decay modes. A binned likelihood technique is utilized and HNLs of mass $100 < m_{\text{HNL}} < 1300 \text{ MeV}/c^2$ are sought. Improved 95% upper limits are presented across this mass range, with more stringent limits being placed at higher masses.

Collaboration / Activity

BABAR

Primary authors: MIDDLETON, Sophie; ANULLI, fabio (INFN Sezione di Roma)**Presenter:** MIDDLETON, Sophie**Session Classification:** T10 Searches for New Physics**Track Classification:** Searches for New Physics